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PATENT  
0425-1064P

## IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: Jianzhou WU Conf.: 3534  
 Appl. No.: 10/659,267 Group: 3641  
 Filed: September 11, 2003 Examiner: A. FELTON  
 For: GAS GENERATING COMPOSITION

DECLARATION UNDER 37 CFR §1.132

Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

Sir:

I, Jianzhou WU, am the inventor of the present application.

I have carried out testing relevant to the properties of the claimed gas generation compositions, as follows:

## Preparation of pellets

Mixtures of guanidine nitrate, copper basic nitrate, aluminum hydroxide, and sodium carboxymethylcellulose were mixed at a weight ratio of 40.7/49.3/5/5. Four different batches were prepared, with different aluminum hydroxide average particle sizes in each component. Each mixture was molded into cylindrical pellets having axial holes therethrough. The pellets had outer diameters of 4.2 mm, inner diameters of 1.1 mm, and lengths of 4 mm.

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**Mist tests**

Inflators for driver-side airbag were charged with 39.4 grams of each batch of pellets. The inflators were tested by igniting them at 85°C in a 60L tank. When the pellets made from aluminum hydroxide having an average particle size of 0.9  $\mu\text{m}$  were ignited, 3.4 grams of gaseous mists were generated. This level of mist generation is unacceptably high. When the pellets made from aluminum hydroxide having an average particle size of 9  $\mu\text{m}$  were ignited, only 0.9 grams of gaseous mists were generated. This level of mist generation is quite low and therefore is acceptable for use in commerce. When the pellets made from aluminum hydroxide having an average particle size of 29  $\mu\text{m}$  were ignited, only 0.7 grams of gaseous mists were generated. This level of mist generation is quite low and therefore is acceptable for use in commerce.

**Ignition tests**

Inflators for driver-side airbag were charged with 39.4 grams of each batch of pellets. The inflators were tested by igniting them at -40°C in a 60L tank. When it was attempted to ignite the pellets made from aluminum hydroxide having an average particle size of 0.9  $\mu\text{m}$ , ignition took place. When it was attempted to ignite the pellets made from aluminum hydroxide

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having an average particle size of 9  $\mu\text{m}$ , ignition took place. When it was attempted to ignite the pellets made from aluminum hydroxide having an average particle size of 29  $\mu\text{m}$ , ignition took place. The aluminum hydroxide particle sizes of 0.9  $\mu\text{m}$ , 9  $\mu\text{m}$  and 29  $\mu\text{m}$  provide gas generating compositions that are acceptable for in commerce. When it was attempted to ignite the pellets made from aluminum hydroxide having an average particle size of 73  $\mu\text{m}$ , no ignition took place. This aluminum hydroxide particle size therefore provides gas generating compositions that are unacceptable for use in commerce.

Results of mist tests and ignition tests may be summarized as follows:

Al(OH) <sub>3</sub> Particle size	Amount of mist generated	Ignition
0.9 $\mu\text{m}$	3.4 grams	ignite
9 $\mu\text{m}$	0.9 grams	ignite
29 $\mu\text{m}$	0.7 grams	ignite
73 $\mu\text{m}$		no ignition

The results of the testing described above provides clear evidence of the facts that aluminum hydroxide particle size has a profound effect on the performance of gas generating compositions that incorporate aluminum hydroxide and that only some but not

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all aluminum hydroxide particle sizes provide useful gas generating compositions.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Nov. 11, 2004

Date

*Jianzhou Wu*  
By \_\_\_\_\_  
Jianzhou WU

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